

A Hybrid Coccinellid. (Plate II.)

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Since 1921 I have been carrying out breeding experiments in connection with several species of our British *Coccinellidae* and I am told it is quite time I published, at least some of, my notes. Certainly, during this period I have got together quite a mass of notes, but for the most part, they are, up to the present, only notes, and they will require sorting and arranging. Even then, I am afraid, our Editors would look askance at the number of pages that would be required for their accommodation. There are, however, certain portions which might prove of immediate interest, and which might induce others to attempt work along the same lines, not only for the sake of verification of my own work, but because there is so much yet to be done.

There is only one of our British *Coccinellidae* which shows more variation than *Adalia bipunctata*, and that is *Coccinella variabilis* (*10-punctata*). Most of the work done in connection with the variations of *A. bipunctata* has been done by Meissner and Schroder, and their classification of the variations depends almost entirely upon elytra coloration.

Briefly put there are two principal forms (a) the Type, in which the elytra are reddish with a black spot of varying size and shape about the middle of each elytron, (b) a form in which black preponderates with reddish spots, varying in number and size upon each elytron.

The best known of these variations are *4-maculata* with two red spots in each elytron, and *6-pustulata* with three red spots on each elytron. There are very numerous other variations, some of the more persistent and pronounced of which have been named, but, roughly speaking, all may be classed under heads (a) and (b), above. So far we have not very complete, reliable statistics to go upon, but, taking the country as a whole, except in certain localities, the red varieties appear to be the commoner. Personally, I have noted, that in all localities where I have made observations, the red varieties predominate in the earlier broods of the year before the hottest weather sets in, whereas, if later, July, August, and September prove fine and hot, then I have found the black forms to predominate. I have noted this on more than one occasion, but my observations are necessarily confined to north country hunting grounds. In a favourite resort of mine my figures for June, 1921, are 30% black forms and August, 1921, 82% black forms, and these are about the average for all the years I have visited that particular area. I have found both red and black forms in hibernation, and on pairing *4-maculata* with *4-maculata* the only 3 survivors to the imago stage were *4-maculata*. A male *4-maculata* paired with a female of type form of *bipunctata* resulted in 5 imagines, 3 of which were *4-maculata* and two not quite, but nearly, type form. In 20 experiments of mating two type forms no really black form resulted, though some of the imagines did approximate to *4-maculata*, but with the red coloration different from that in what is known as *4-maculata*. With these observations to guide me I experimented and found—

1. Type form *bipunctata* is more difficult to rear than darker forms, and especially in the larval stage, where the least neglect or inadequacy of food supply is immediately fatal.

JUNE 15TH, 1926.

2. Dark forms (b) will live and thrive in a temperature which kills off lighter or type forms (a).

3. Dark forms are more catholic in the matter of food and not so liable to die off at once if supplies get low.

There is another curious feature worth noting in connection with *bipunctata* in my local collecting grounds. The numbers of type form, always fluctuating from year to year are, I believe, becoming now gradually less. In some areas here it has not been seen for some years now; 1921 was the last year when I myself noted it in any quantity in any of our country areas. On the other hand the black forms seem to be on the increase, at any rate in late summer, when most of my outdoor work in the woods is done.

But by far the most interesting portion of my study has been that in connection with what I have discovered to be a hybrid. Space will not permit of a complete record, so a few notes must suffice for the present occasion. *Bipunctata* is both polygamous and polyandrous. As has been stated above, if a male of type form be mated with a female of type form the resulting imagines are as a rule type forms, though there is an occasional approach to black form. When a male of type is wedded to a female *A. maculata* the results with me at any-rate, have tended to *A. maculata*. *A. bipunctata* will mate readily with *C. variabilis* or with *C. 14-guttata*, and it was an accidental mating of *A. bipunctata* female with male of *C. variabilis* in one of my breeding boxes, which originated my experiments with the form so well-known to collectors, so often classified by them as *C. variabilis* and of which as yet the origin has not been stated.

Throughout my experimental notes I have referred to this hybrid as 'K' and will continue for the present so to call it. I had two facts to go upon (1) I had taken 'K' quite freely in August and September in a locality where *A. bipunctata* and *C. variabilis* were both fairly common, the latter especially so. (2) This specimen 'K' accidentally bred from a mating of a female *bipunctata* with a male *variabilis*. Further matings were tried with a fairly stable preponderance of 'K' variety resulting in every case. These were followed by mating 'K' with 'K.' According to the law of Mendelism the the result should have been either nil or a reversion to one of the type forms. There were certainly some reversions to type mostly of *variabilis* with an occasional type *bipunctata*. That there were not more of the imagines showing reversion is, I think, to be explained by the fact that only a small proportion of the ova in any case came through the larval and pupal stages successfully. Those who have tried breeding *Coccinellidae* will understand this. Now I found that these 'K' forms were much more hardy than the normal or type forms of either *bipunctata* or *variabilis*. They will stand, without harm, greater variety in feeding, periods of food scarcity, and greater extremes of temperature. When food is more plentiful they are also much more voracious than either of the type forms. In all those I have bred during 5 seasons, and in all those I have taken wild of 'K' there has been practically no variation in elytra markings except occasionally in the size of the spots and the shade of light and dark colours, and the colour of the legs which are sometimes black, sometimes light.

To come to a fine point of distinction, if the characteristics of *A. bipunctata* and *C. variabilis* as given by Fowler be applied to 'K' I

doubt if a single specimen would be found which tallies exactly and wholly with either, yet every specimen I have taken or bred has some of the characteristics of both, and this, once its origin is recognised, is only natural. Taken on the whole however, and including all points (black legs, etc.), upon which the classification is usually made, I find the hybrid leans more to *Coccinella* than to *Adalia*, and therefore propose for it the name *hyb. biabilis*, so as to include both its undoubted progenitors, and denote its true origin.

Here we have what may be termed a Natural Hybrid hardier than either of its progenitors. As to its distribution, it is to be found wherever the two forms *bipunctata* and *variabilis* are found together, though I may add that locally this hybrid has spread from such areas and is now to be found in almost any part of the countryside around the woods, where I first came across it. Correspondents tell me they have taken it in similar areas where the two types are found together in South East and Midlands. On the other hand, so far as my present data go, 'K' is not found in localities, where only one of the two *bipunctata* or *variabilis* is found, but upon this point I want more data. I have taken it on oak, beech, pine, fir, whin, garden rose, and by sweeping low herbage, under or near these trees. In captivity I have fed it on aphids from rose, beech, pine, and on honey and crushed plum and nettle pollen when aphids failed.

If one might be permitted to theorise upon this insect, one is inclined to say that here is probably a new species in process of evolution. Of hybrid origin it is worthy of note that so far I have only succeeded when starting with the female of *bipunctata* and male of *variabilis*. With male *bipunctata* and female *variabilis*, I have not so far been successful in producing any imago of 'K' type. This insect has become fairly common in nature and can be taken when neither of its original progenitors are to be found, simply, I am led to believe, because it is more hardy. To argue that its production is contrary to the laws of hybridisation is not to allow for the fact that in the breeding of any Coccinellid in captivity and in nature, only a small percentage of the ova ever get through to maturity, and naturally the weakest perish, while the strongest and sturdiest survive, and this fact would seem to show that 'K' is a sort of survival of the fittest and probably a new species taking the place of less hardy species, at least in the North here. To really settle the matter more data must be accumulated and more experiments must be made, and I should be pleased to hear the results of any collecting experiences or breeding experiments, which might be helpful towards this end.

DESCRIPTION.—*Coccinella* *hyb. biabilis*, varies from oval convex to hemispherical, thorax black, sometimes light at anterior angles or margins, sometimes spotted. Elytra finely punctured, the transverse fold of *variabilis* sometimes present, often absent. Legs either black or yellow, underside dark, often black. Elytra with 5 yellowish (varying to very reddish yellow) spots, as in diagram, on black, dark brown, or yellowish brown ground. Spots vary in size but the shape of the two lunar spots is an unvarying characteristic. Occasionally the 2 apical spots joined at apex.

DISTRIBUTION.—So far recorded from Kent, Sussex, Essex, Hants, Cumberland, but probably everywhere where *bipunctata* and *variabilis* are found together.